Model 35600

Multi-Operational Apparatus for Reaction Time (MOΨART)

USER INSTRUCTIONS

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System Description:

The Multi-Operational Apparatus for Reaction Time (MOΨART) is an integrated, versatile device used for the study of cognitive processing. It can perform a wide range of tests including reaction time, choice reaction time, reaction/movement time, and tapping tests. The MOΨART features state-of-the-art touch sensitive keypads for ultra-accurate reaction times with no key travel errors. It also uses tri-color stimulus lights and dual tone generation, giving it a high degree of versatility in stimulus presentation. Combined with the PsymCon control panel, it can provide six highly adaptable tests that will find use in any motor behavior laboratory.

This manual describes the MOΨART panel when used as a stand-alone device only. A second set of instructions will be issued with the software release describing the use of the MOΨART with the computer interface.

Parts:

- MOΨART panel: Main panel for the system
- 12V DC power supply with power cord
- PsymCon Interface: Button and display panel for the main panel
- 25' conductor cable.

Test Types:

When used in a stand-alone mode, the MOΨART can run six different types of reaction time tests. The test types are:

A. Simple Reaction Time
B. Choice Reaction Time
C. Simple Reaction/Movement Time
D. Choice Reaction/Movement Time
E. Single Key Tapping Test
F. Dual Key Tapping Test

Custom experiments will be available through the computer software. The user will be able to design an experiment based on the system parameters. The computer also allows the running of two independent experiment schedules simultaneously.

Features:

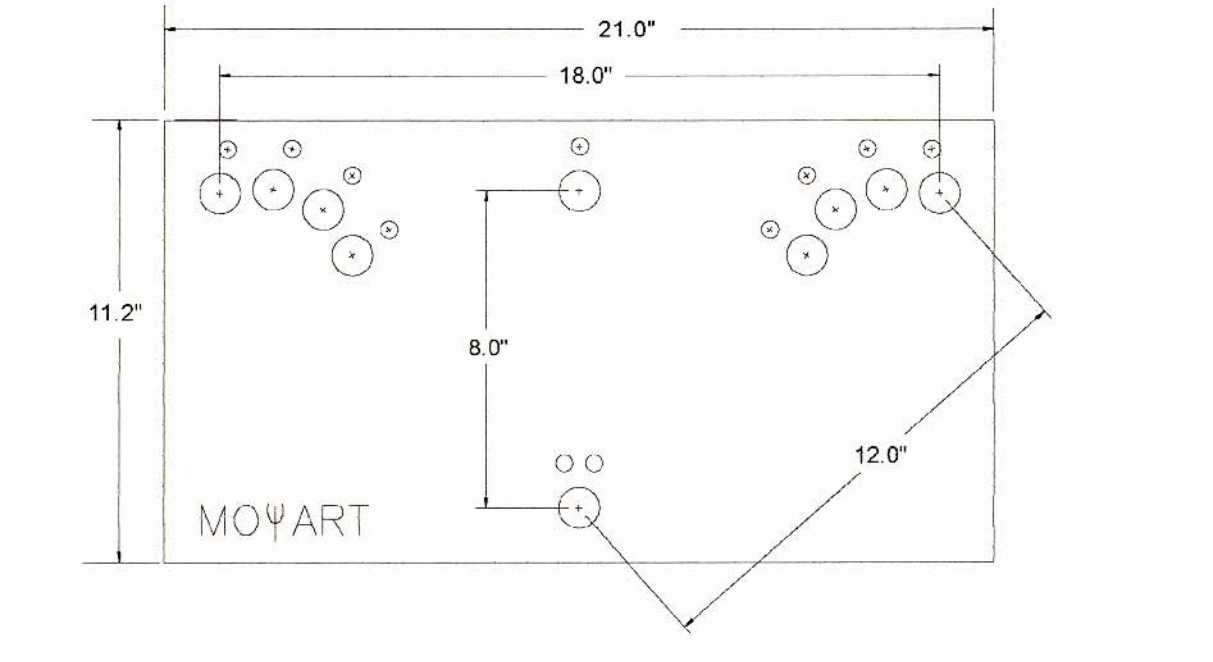
- Touch sensitive keypads
- Ergonomic placements for the touch keys
- Custom key layouts available
- Configurable keys for press or release responses
- Dual zone keys for precision hit detection
- Red, green or orange colored stimulus lights
- Dual tone stimulus with user controlled volume
- Configurable experiment parameters
- User set random stimulus weighting
- Random cue delay times
- Go/No Go choice reaction experiments
- Headphone and audio input options
- Trigger and event mark outputs

Specifications:

Low Tone:	200Hz
High Tone:	1kHz
Tone Volume:	75-85 dB max.
Headphone:	90-105 dB max. depending on style
Stimulus:	9 tri-color lights, high or low tone
Keys:	Touch sensitive with dual accuracy zones
Cue:	Tri-color light, high or low tone
Cue Time:	Fixed, random or none
Cue Time Range:	0-25.5 seconds, 0.1 second resolution
Error Types:	Early response, no response, incorrect response, inaccurate response
Response Timeout:	0-25.5 seconds, 0.1 second resolution
Tapping Duration:	0-120 seconds, 1.0 second resolution
Power:	12VDC, 1.0 Amp supplied with AC adapter
Computer Conn:	USB
Timing Resolution:	0.001 seconds ± 0.005%
Dimensions:	21.0” x 11.2” x 2.5”
Control Interface:	Lafayette PsymCon Model 35500 or PsymSoft software Model 35800
Aux. Connector:	8-pin circular mini-DIN

Front Panel Description:

The MOΨART front panel uses an ergonomic design for the button layout. The design is based on established normal distances for tapping tests and published standards for reaction time experiments. Each key site features a dual zone touch sensitive keypad. The inner and outer zone of each key can be monitored separately allowing the accuracy of responses to be monitored. Each key site also features a tri-color LED stimulus light. The light can be set for red, green or orange stimulus (orange available through computer control only). The main key site at the bottom of the panel (C0) uses two separate lights, which allows greater flexibility when presenting stimuli. Each key site is labeled on the panel. These labels are referenced in both the control hardware and software to set up the various experiments.



Note: Static Discharge Information: The metallic keys and connectors on the MOΨART are susceptible to static discharge. If a user or subject "shocks" one of the buttons or headphone connectors, errant operation may occur. This may include the LCD screen on the control going blank or tests that will not run correctly. Static discharges will not permanently damage panel and normal operation can be restored by turning the power off and restarting the panel. For best operation, always plug in headphones before starting the panel and avoid building up static charge before using MOΨART.

Rear Panel Description:

The rear panel provides all of the external connections for the MOΨART. The following is the connector description for the panel, starting from the left side of the panel (when facing the back).

USB connector:

Used to connect the panel to the computer for software control. Plugging in the USB connector disables the PsymCon control module.

PsymCon connector:

Used to connect the manual control module (PsymCon) to the MOΨART. The 25 pin connecting cable is included with the system.

DC Power Inlet:

The 12V-power supply plugs into this connector.

Power Switch:

Turns the panel ON and OFF.

Power Indicator:

Illuminates when power is applied.

External Initiate (RCA style connector):

A switch closure on this input starts a test. This input can be used to remotely initiate tests or allow a second piece of equipment to control the initiate function.

Event Out 2 (3.5mm phono style connector):

Event marker output for schedule 2. The event mark is a 60ms (0.060 seconds) pulse width. The output is normally at a 5V level. The event mark drives the output to 0V for 60ms. When used in stand-alone operation, schedule 2 is not implemented and this event marker is not used. When used with the computer software, a mark can be assigned to any event in the schedule 2 experiment.

Event Out 1 (3.5mm phono style connector):

Event marker output for schedule 1. The event mark is a 60ms (0.060 seconds) pulse width. The output is normally at a 5V level. The event mark drives the output to 0V for 60ms. When the panel is used in stand-alone operation, the end of schedule automatically causes an event mark. This end of schedule event mark is fixed. It can not be turned off and no other events can be marked. When used with the computer software, a mark can be assigned to any event in the schedule 1 experiment.

Trigger Out 2 (RCA style connector):

Trigger output for schedule 2. The trigger is used to send timing signals to other equipment. The trigger line is normally at a 5V level. The trigger pulls the output to 0V for 20, 40, or 60 milliseconds depending on the trigger type:

Stimulus events:	20ms
Response events:	40ms
End of Schedule:	60ms
Other events:	20ms

In stand-alone operation, schedule 2 is not implemented and this trigger output is not used. When used with the computer software, a trigger can be assigned to any event in the schedule 2 experiment.

Trigger Out 1 (RCA style connector):

Trigger output for schedule 1. The trigger is used to send timing signals to other equipment. The trigger line is normally at a 5V level. The trigger pulls the output to 0V for 20, 40, or 60 milliseconds depending on the trigger type:

Stimulus events:	20ms
Response events:	40ms
End of Schedule:	60ms
Other events:	20ms

When used in stand alone operation, the cue, stimulus, response (correct, errors, and taps) and the End of Schedule automatically output trigger signals. When used with the computer software, a trigger can be assigned to any event in the schedule 1 experiment.

Auxiliary 5 through Auxiliary 1 (8 pin mini-DIN style connector):

Connectors for Auxiliary keys or lights. These ports allow peripheral devices to be connected to the MOΨART panel. When used with the PsymCon control module, auxiliary ports are limited or unavailable for certain test types, as documented in the test type descriptions. Computer operation allows the use of all auxiliary ports. Auxiliary devices may include, but are not limited to:

- touch keys
- stimulus lights
- remote response buttons
- switch mats
- foot switches
- photobeam switches

* Custom devices can be made to interface to the auxiliary ports.

Headphone Jack (3.5mm stereo jack):

Connector for headphones. The headphones can be used to listen to the tone or the external audio input signal. Plugging in the headphones automatically disables the internal speaker.

Audio In (3.5mm stereo jack):

Allows an external audio signal to be input into the panel. The audio signal overrides the tone settings for an experiment. Any cue or stimulus setting that uses high or low tone will activate the external audio instead.

Volume control:

Controls the volume of the tone. The volume adjust controls the tone whether it is routed to the headphones or to the internal speaker. The volume has no control of the external audio signal on the "Audio In" jack. This volume must be controlled by the external audio source.

Test Instructions and Descriptions:

Connections:

To start the MOΨART, connect the 12V-power supply from an available wall outlet to the power connector on the rear panel. Connect the PsymCon keypad to the MOΨART rear panel using the 25-pin cable that accompanies the PsymCon keypad. After all of the connections are made, the MOΨART panel can be powered on by flipping the switch on the rear panel. The PsymCon panel must be connected before turning the power on, otherwise it will not startup correctly. The power indicator LED on the rear panel should illuminate upon applying power.

Menu Operation:

Following are the descriptions for each of the six test types. The test type to be run is selected from the Main Menu screen. Each selection leads to a menu sequence for that test type. The menus set all of the options for the desired test type. In screens where a selection is required, advancement is not allowed until a selection is made. Other test parameters are optional and can be skipped during the setup and excluded from the experiment.

All Menu screens are actuated by pressing the button corresponding to the desired menu choice.

A. Simple Reaction Time:

A single stimulus is presented. The subject responds to the stimulus as quickly as possible with no conditions or choices.

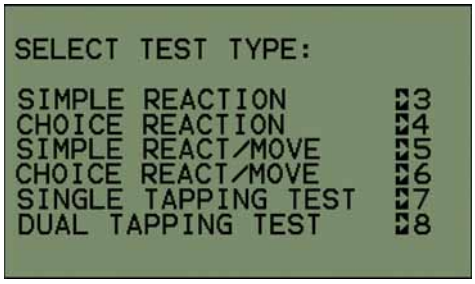
Variations: Simple Reaction, GO/NO GO Test

GO/NO GO: A choice of two or more stimuli is presented. If the "GO" stimulus is presented, the subject responds as quickly as possible. If a "NO GO" stimulus is presented, the subject does not respond.

Test Restrictions:

1. The Response Key is restricted to C0.
2. The Stimulus is restricted to the C0 lights or tone.
3. The Cue stimulus is restricted to the C5 lights or tone.

1. Press button 3 from the Main Menu.



2. Select Stimulus Screen:

Allows the user to set the "GO" stimulus (the stimulus that will be responded to) for the test. The stimulus can be a combination of the choices (e.g. red light with low tone). The exception is that the high tone and low tone cannot both be selected. The menu will not advance beyond this screen until a choice has been made.

Menu Controls:

Button 1:		
Button 2:		
Button 3:	Select Red Light as "GO" Stimulus	(RED LIGHT)
Button 4:	Select Green Light as "GO" Stimulus	(GREEN LIGHT)
Button 5:	Select High Tone as "GO" Stimulus	(HIGH TONE)
Button 6:	Select Low Tone as "GO" Stimulus	(LOW TONE)
Button 7:	Return to Previous Menu Screen	(BACK)
Button 8:	Proceed to Next Menu Screen	(NEXT)

Note: Green light and low tone are selected as an example.

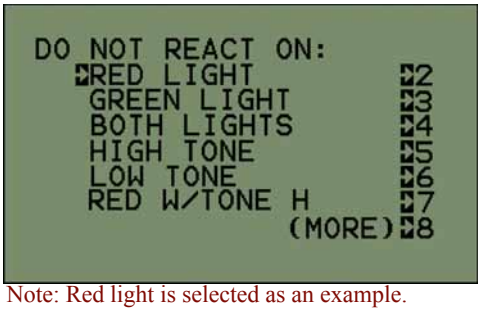
A. Simple Reaction Time: (continued)

3. "Do Not React On" Screen:

Allows the user to set the "NO GO" stimulus (the stimulus that will not be responded to) for the test. This listing takes up two different menu screens. Any combination of stimuli may be used, but the "GO" stimulus cannot be selected as a "NO GO". This screen also determines the number of different stimulus possibilities that will be used during the test. If a simple reaction time experiment is desired, this selection may be skipped with no selection being made. To get back to the Stimulus Select Screen from this screen, the menu must be advanced to the "Stimulus Odds" screen and then returned back to the stimulus screen by pressing the "BACK" button.

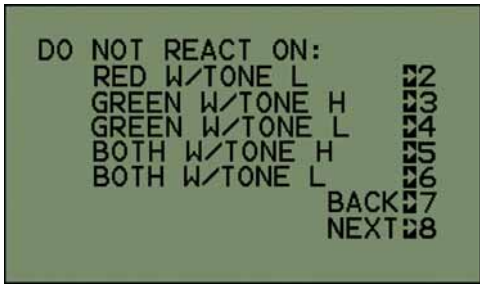
Menu Controls:

Button 1:
Button 2: Select Red Light as "NO GO" Stimulus (RED LIGHT)
Button 3: Select Green Light as "NO GO" Stimulus (GREEN LIGHT)
Button 4: Select Both Red and Green Lights as "NO GO" Stimulus (BOTH LIGHTS)
Button 5: Select High Tone as "NO GO" Stimulus (HIGH TONE)
Button 6: Select Low Tone as "NO GO" Stimulus (LOW TONE)
Button 7: Select Red Light with High Tone as "NO GO" Stimulus (RED W/TONE H)
Button 8: Proceed to Next Screen for More Options ((MORE))



Note: Red light is selected as an example.

Button 1:
Button 2: Select Red Light with Low Tone as "NO GO" Stimulus (RED W/TONE L)
Button 3: Select Green Light with High Tone as "NO GO" Stimulus (GREEN W/TONE H)
Button 4: Select Green Light with Low Tone as "NO GO" Stimulus (GREEN W/TONE L)
Button 5: Select Red and Green Lights with High Tone as "NO GO" Stimulus (BOTH W/TONE H)
Button 6: Select Red and Green Lights with Low Tone as "NO GO" Stimulus (BOTH W/TONE L)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



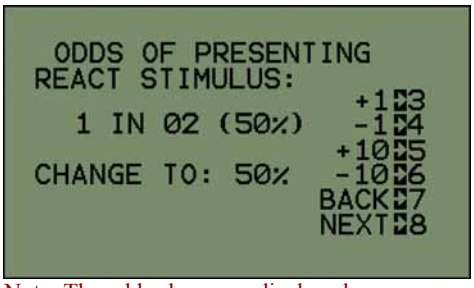
A. *Simple Reaction Time:* (continued)

4. Stimulus Odds Screen:

Calculates the odds of presenting a "GO" stimulus. The odds are calculated based on the total number of possible stimuli as selected from the "GO" and "NO GO" settings. For example, if three "NO GO" stimuli are selected, the odds of a "GO" stimulus will be 1 in 4 or 25%. If no "NO GO" stimuli are selected, the odds will always be 100%. The odds for presenting a "GO" stimulus can be adjusted using this menu screen. The random stimulus selector will be weighted according to the setting on this screen.

Menu Controls:

Button 1:
Button 2:
Button 3: Increment Odds by 1 Percent (+1)
Button 4: Decrement Odds by 1 Percent (-1)
Button 5: Increment Odds by 10 Percent (+10)
Button 6: Decrement Odds by 10 Percent (-10)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



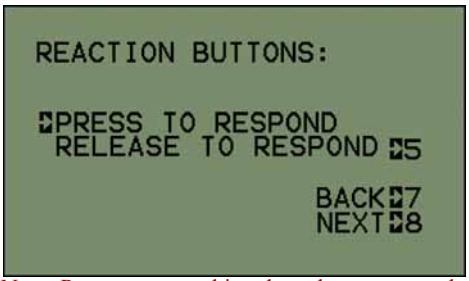
Note: The odds above are displayed as an example.

5. Reaction Button Setup Screen:

The touch keys on the panel can be configured as "Press to Respond" or "Release to Respond" using the menu choice in this screen. The response key is always C0 when running Simple Reaction Time experiments. With "Press to Respond", the user starts with their finger off of the key and presses the key upon stimulus presentation. With "Release to Respond" the subject starts with their finger on the key and lifts it upon the presentation of the stimulus. The "Release to Respond" typically gives a more accurate reaction time as it does not have a movement component integrated into the result as does the "Press to Respond" protocol.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Toggle Between Press to Respond and Release to Respond
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: Press to respond is selected as an example.

A. Simple Reaction Time: (continued)

6. Select Cue Screen:

Allows the user to select the cue stimulus for the test. The cue is always the C5 lights and/or tone when running Simple Reaction Time experiments. Only one light may be selected as a cue although it may be paired with a tone. If the tone is used as a stimulus for the test, it may not be selected as a cue. This screen may be skipped with no selection being made if no cue is desired.

Menu Controls:

Button 1:		
Button 2:	Select Red Light as Cue Stimulus	(RED LIGHT)
Button 3:	Select Orange Light as Cue Stimulus	(ORANGE LIGHT)
Button 4:	Select Green Light as Cue Stimulus	(GREEN LIGHT)
Button 5:	Select High Tone as Cue Stimulus	(HIGH TONE)
Button 6:	Select Low Tone as Cue Stimulus	(LOW TONE)
Button 7:	Return to Previous Menu Screen	(BACK)
Button 8:	Proceed to Next Menu Screen	(NEXT)

Note: Orange light is selected as an example.

7. Cue Delay Select Screen:

Allows the user to set the cue delay for the test. The resolution for the cue delay is 0.1 seconds with a maximum setting of 25.5 seconds. The random cue setting can also be enabled. The random time will fall between ½ times and 2 times the setting on the screen. The maximum and minimum limits of the random cue period are displayed at the bottom of the screen for reference.

Menu Controls:

Button 1:	Increment Cue Delay by 0.1	(+0.1)
Button 2:	Decrement Cue Delay by 0.1	(-0.1)
Button 3:	Increment Cue Delay by 1	(+1)
Button 4:	Decrement Cue Delay by 1	(-1)
Button 5:	Increment Cue Delay by 10	(+10)
Button 6:	Decrement Cue Delay by 10	(-10)
Button 7:	Toggle Random Delay ON/OFF	(RANDOM)
Button 8:	Proceed to Next Menu Screen	(NEXT)

Note: 2.5 seconds is selected as an example.

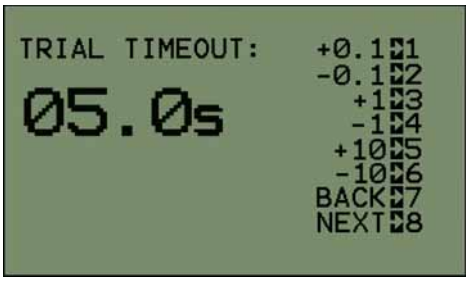
A. *Simple Reaction Time:* (continued)

8. Trial Timeout Selection Screen:

Allows the user to set the trial timeout time. If no response is made within the time selected, an error is indicated for the trial. The time is selectable from 0.1 to 25.5 seconds in 0.1-second increments. The timeout setting defaults to 3.0 seconds on startup.

Menu Controls:

Button 1:	Increment Trial Timeout by 0.1	(+0.1)
Button 2:	Decrement Trial Timeout by 0.1	(-0.1)
Button 3:	Increment Trial Timeout by 1	(+1)
Button 4:	Decrement Trial Timeout by 1	(-1)
Button 5:	Increment Trial Timeout by 10	(+10)
Button 6:	Decrement Trial Timeout by 10	(-10)
Button 7:	Return to Previous Menu Screen	(BACK)
Button 8:	Proceed to Next Menu Screen	(NEXT)



Note: 5.0 seconds is selected as an example.

9. Test Screen:

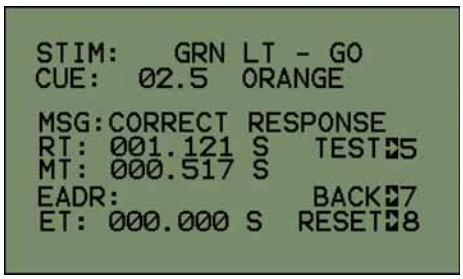
Summarizes the test as setup from the menus and displays the trial results. The first two lines of the screen indicate the stimulus and cue parameters selected for the trial. These settings will update on the onset of each trial if random parameters are being used. The stimulus line will also indicate if a "GO" or "NO GO" stimulus is being presented.

10. Trial Results:

After the trial, the "RT" line will show the results of the trial in seconds and the "MSG" line will indicate a successful trial or an error. If an error occurs, the "MSG" line will specify the error and the "EADR" will indicate the errant key, if applicable. The "ET" line indicates the time when the error occurred.

Menu Controls:

Button 1:		
Button 2:		
Button 3:		
Button 4:		
Button 5:	Run Test	(TEST)
Button 6:		
Button 7:	Return to Previous Menu Screen	(BACK)
Button 8:	Reset Test Screen	(RESET)



Note: The results above are being used as an example.

A. Simple Reaction Time: (continued)

11. How to Start a Trial:

Trials are executed by pressing button 5 while in the Test Screen. If random parameters are used for the trial, they will update on the onset of each trial. Trial results can be reset or a trial can be interrupted by pressing the RESET button (8). Interrupted trials will not return any results.

***Possible Response Errors*:**

When running Simple Reaction Time tests, three different response errors are possible:

a. Incorrect Response: Response was made when a "NO GO" stimulus was presented.

b. Timeout: No response was made when a "GO" stimulus was presented.

c. Early Response: Response was made during the cue delay.

Note: Error types and locations are displayed on the Test Screen. Only errors on button C0 are recorded. All other buttons are ignored for this test type.

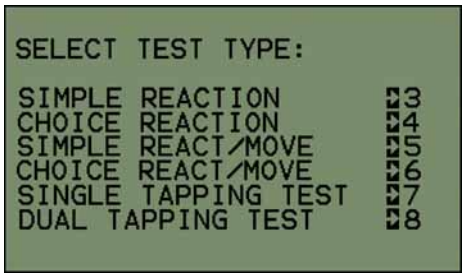
B. Choice Reaction Time:

The subject has fingers over multiple keys. A stimulus tone or light turns on over one of the keys. The subject responds by pressing or releasing the corresponding key as quickly as possible.

Test Restrictions:

1. The C5 lights can not be used as a stimulus.
2. Aux. 1 and 2 are the only Aux. channels that can be selected.
3. The cue stimulus is restricted to the C5 lights or tone.
4. The response to a tone stimulus is C0.

1. Press button 4 from the Main Menu.

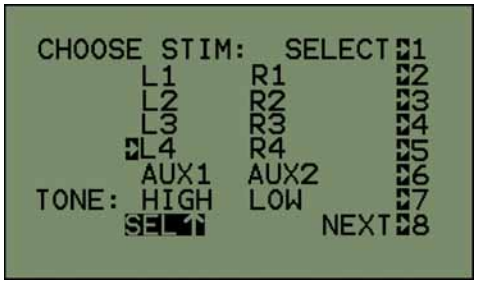


2. Stimulus Select Screen:

Allows the user to select the stimuli to be used in the test. The stimuli are referenced to the key site locations on the panel. A select cursor is shown at the bottom of the screen to indicate which column is active for selection. Tone may be used as a selection, but high and low tone cannot both be selected. The tone response will always be on key C0. Only keys that are included in the test will be monitored during a trial. Keys that are not included in the test are ignored and will not indicate an error or correct response if pressed. The actual stimulus presented is chosen at random from the list of all stimuli included in the experiment.

Menu Controls:

Button 1:	Toggle Between Columns for Selection	(SELECT)
Button 2:	Select L1 and/or R1 Site(s) as Stimulus	(L1 R1)
Button 3:	Select L2 and/or R2 Site(s) as Stimulus	(L2 R2)
Button 4:	Select L3 and/or R3 Site(s) as Stimulus	(L3 R3)
Button 5:	Select L4 and/or R4 Site(s) as Stimulus	(L4 R4)
Button 6:	Select to Use Auxiliary Keys or Lights Through the Aux 1 and/or Aux 2 Port(s)	(AUX1 AUX2)
Button 7:	Select High or Low Tone as Stimulus	(HIGH LOW)
Button 8:	Proceed to the Next Menu Screen	(NEXT)



Note: L4 is selected as an example.

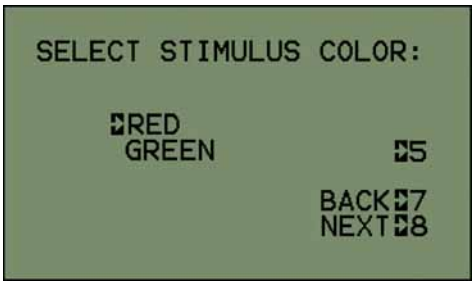
B. Choice Reaction Time: (continued)

3. Select Stimulus Color Screen:

Designates if red or green lights will be used as stimuli for the test.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Toggle Between Selecting Red or Green as Stimulus Color
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to the Next Menu Screen (NEXT)



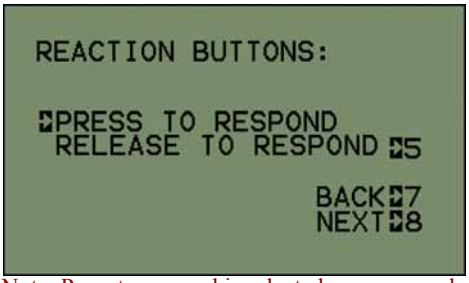
Note: Red is selected as an example.

4. Reaction Button Setup Screen:

The touch keys on the panel can be configured as "Press to Respond" or "Release to Respond" using the menu choice in this screen. With "Press to Respond", the user starts with their finger off of the key and presses the key upon stimulus presentation. With "Release to Respond", the subject starts with their finger on the key and lifts it upon the presentation of the stimulus. The "Release to Respond" typically gives a more accurate reaction time as it does not have a movement component integrated into the result as does the "Press to Respond" protocol. If "Release to Respond" protocol is used, the subject must have fingers on all of the selected keys before the test is initiated. Failure to do so will result in "Early Response" errors.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Toggle Between Press to Respond and Release to Respond
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: Press to respond is selected as an example.

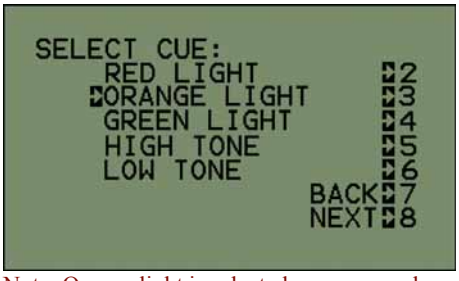
B. Choice Reaction Time: (continued)

5. Select Cue Screen:

Allows the user to select the cue stimulus for the test. The cue is always the C5 lights and/or tone when running Choice Reaction Time experiments. Only one light may be selected as a cue although it may be paired with a tone. If the tone is used as a stimulus for the test, it may not be selected as a cue. This screen may be skipped with no selection being made if no cue is desired.

Menu Controls:

Button 1:		
Button 2:	Select Red Light as Cue Stimulus	(RED LIGHT)
Button 3:	Select Orange Light as Cue Stimulus	(ORANGE LIGHT)
Button 4:	Select Green Light as Cue Stimulus	(GREEN LIGHT)
Button 5:	Select High Tone as Cue Stimulus	(HIGH TONE)
Button 6:	Select Low Tone as Cue Stimulus	(LOW TONE)
Button 7:	Return to Previous Menu Screen	(BACK)
Button 8:	Proceed to Next Menu Screen	(NEXT)



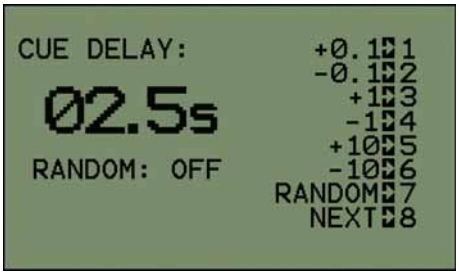
Note: Orange light is selected as an example.

6. Cue Delay Select Screen:

Allows the user to set the cue delay for the test. The resolution for the cue delay is 0.1 seconds with a maximum setting of 25.5 seconds. The random cue setting can also be enabled. The random time will fall between ½ times and 2 times the setting on the screen. The maximum and minimum limits of the random cue period are displayed at the bottom of the screen for reference.

Menu Controls:

Button 1:	Increment Cue Delay by 0.1	(+0.1)
Button 2:	Decrement Cue Delay by 0.1	(-0.1)
Button 3:	Increment Cue Delay by 1	(+1)
Button 4:	Decrement Cue Delay by 1	(-1)
Button 5:	Increment Cue Delay by 10	(+10)
Button 6:	Decrement Cue Delay by 10	(-10)
Button 7:	Toggle Random Delay ON/OFF	(RANDOM)
Button 8:	Proceed to Next Menu Screen	(NEXT)



Note: 2.5 seconds is selected as an example.

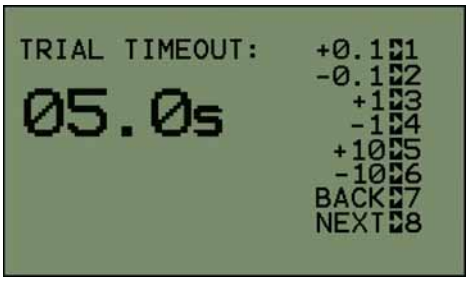
B. Choice Reaction Time: (continued)

7. Trial Timeout Selection Screen:

Allows the user to set the trial timeout time. If no response is made within the time selected, an error is indicated for the trial. The time is selectable from 0.1 to 25.5 seconds in 0.1-second increments. The timeout setting defaults to 3.0 seconds on startup.

Menu Controls:

Button 1: Increment Trial Timeout by 0.1 (+0.1)
Button 2: Decrement Trial Timeout by 0.1 (-0.1)
Button 3: Increment Trial Timeout by 1 (+1)
Button 4: Decrement Trial Timeout by 1 (-1)
Button 5: Increment Trial Timeout by 10 (+10)
Button 6: Decrement Trial Timeout by 10 (-10)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: 5.0 seconds is selected as an example.

8. Test Screen:

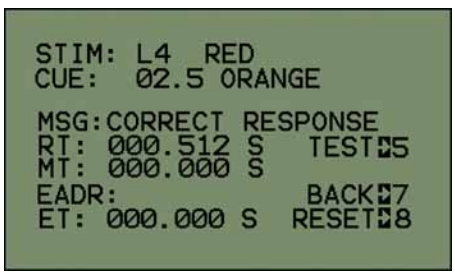
Summarizes the test as setup from the menus and displays the trial results. The first two lines of the screen indicate the stimulus and cue parameters selected for the trial. These settings will update on the onset of each trial if random parameters are being used.

9. Trial Results:

After the trial, the "RT" line will show the results of the trial in seconds and the "MSG" line will indicate a successful trial or an error. If an error occurs, the "MSG" line will specify the error and the "EADR" will indicate the errant key, if applicable. The "ET" line indicates the time when the error occurred. After an incorrect response, the subject can then make a correction and press the correct key. The corrected response will be shown on the "RT" line with the error information also being displayed as appropriate.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Run Test (TEST)
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Reset Test Screen (RESET)



Note: The results above are being used as an example.

B. Choice Reaction Time: (continued)

10. How to Start a Trial:

Trials are executed by pressing button 5 while in the Test Screen. If random parameters are used for the trial, they will update on the onset of each trial. Trial results can be reset or a trial can be interrupted by pressing the "RESET" button (8). Interrupted trials will not return any results.

***Possible Response Errors*:**

When running Choice Reaction Time tests, three different response errors are possible:

a. Incorrect Response: The wrong key was pressed in response to the stimulus.

b. Timeout: No response was made in the time allotted by the "Timeout setting".

c. Early Response: Response was made during the cue delay.

Note: Error types and locations are displayed on the Test Screen. Only errors on keys selected for the test are recorded. All other keys are ignored for this test.

C. Simple Reaction/Movement Time:

Variations: Simple Reaction/Movement, GO/NO GO Test

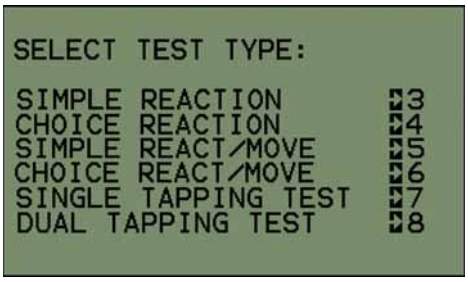
Simple: The subject rests their finger on the C0 key. After a stimulus is presented, the subject lifts their finger off of the C0 key and taps the C5 key as quickly as possible.

GO/NO GO: The subject rests their finger on the C0 key. If the "GO" stimulus is presented, the subject lifts their finger off of the C0 key and taps the C5 key as quickly as possible. If the "NO GO" stimulus is presented, the subject keeps their finger on the C0 key.

Test Restrictions:

1. The cue stimulus is restricted to the C5 lights or tone.
2. The test stimulus is restricted to the C0 lights or tone.
3. The response keys are restricted to C0 and C5.

1. Press button 5 from the Main Menu.



2. Select Stimulus Screen:

Allows the user to set the "GO" stimulus (the stimulus that will be responded to) for the test. The stimulus can be a combination of the choices (e.g. red light with low tone). The exception is that the high tone and low tone cannot both be selected. The menu will not advance beyond this screen until a choice has been made.

Menu Controls:

Button 1:
Button 2:
Button 3: Select Red Light as "GO" Stimulus (RED LIGHT)
Button 4: Select Green Light as "GO" Stimulus (GREEN LIGHT)
Button 5: Select High Tone as "GO" Stimulus (HIGH TONE)
Button 6: Select Low Tone as "GO" Stimulus (LOW TONE)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)

Note: Green light and low tone are selected as an example.

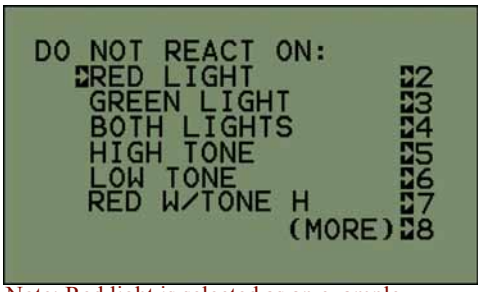
C. Simple Reaction/Movement Time: (continued)

3. "Do Not React On" Screen:

Allows the user to set the "NO GO" stimulus (the stimulus that will not be responded to) for the test. This listing takes up two different menu screens. Any combination of stimuli may be used, but the "GO" stimulus cannot be selected as a "NO GO". This screen also determines the number of different stimulus possibilities that will be used during the test. If a simple reaction time experiment is desired, this selection may be skipped with no selection being made. To get back to the Stimulus Select Screen from this screen, the menu must be advanced to the Stimulus Odds screen and then returned back to the stimulus screen by pressing the "BACK" button.

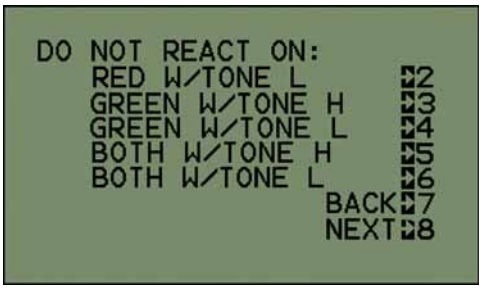
Menu Controls:

Button 1:
Button 2: Select Red Light as "NO GO" Stimulus (RED LIGHT)
Button 3: Select Green Light as "NO GO" Stimulus (GREEN LIGHT)
Button 4: Select Both Red and Green Lights as "NO GO" Stimulus (BOTH LIGHTS)
Button 5: Select High Tone as "NO GO" Stimulus (HIGH TONE)
Button 6: Select Low Tone as "NO GO" Stimulus (LOW TONE)
Button 7: Select Red Light with High Tone as "NO GO" Stimulus (RED W/TONE H)
Button 8: Proceed to Next Screen for More Options ((MORE))



Note: Red light is selected as an example.

Button 1:
Button 2: Select Red Light with Low Tone as "NO GO" Stimulus (RED W/TONE L)
Button 3: Select Green Light with High Tone as "NO GO" Stimulus (GREEN W/TONE H)
Button 4: Select Green Light with Low Tone as "NO GO" Stimulus (GREEN W/TONE L)
Button 5: Select Red and Green Lights with High Tone as "NO GO" Stimulus (BOTH W/TONE H)
Button 6: Select Red and Green Lights with Low Tone as "NO GO" Stimulus (BOTH W/TONE L)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



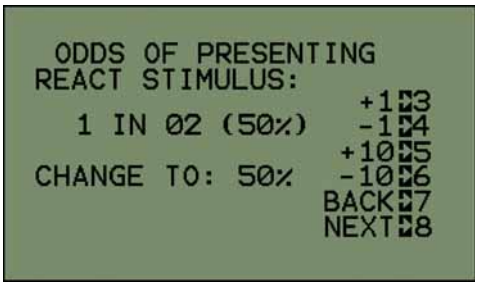
C. Simple Reaction/Movement Time: (continued)

4. Stimulus Odds Screen:

Calculates the odds of presenting a "GO" stimulus. The odds are calculated based on the total number of possible stimuli as selected from "GO" and "NO GO" settings. For example, if three "NO GO" stimuli are selected, the odds of a "GO" stimulus will be 1 in 4 or 25%. If no "NO GO" stimuli are selected, the odds will always be 100%. The odds for presenting a "GO" stimulus can be adjusted using this menu screen. The random stimulus selector will be weighted according to the setting in this screen.

Menu Controls:

Button 1:
Button 2:
Button 3: Increment Odds by 1 Percent (+1)
Button 4: Decrement Odds by 1 Percent (-1)
Button 5: Increment Odds by 10 Percent (+10)
Button 6: Decrement Odds by 10 Percent (-10)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



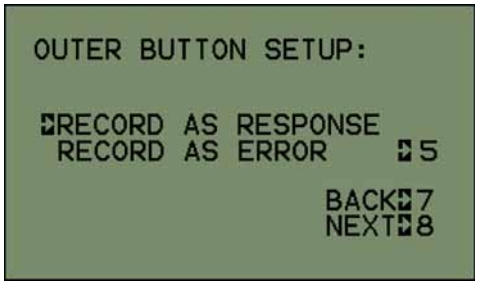
Note: The odds above are displayed as an example.

5. Outer Button Setup Screen:

The response keys on the Reaction Panel feature dual response zones. This allows the accuracy of the response to be monitored if required. The Outer Button Setup Screen determines if the outer rim of the response key will be recorded as a correct response or as an accuracy error.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Toggle Between Record as Response and Record as Error
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: Record as Response is selected as an example.

C. Simple Reaction/Movement Time: (continued)

6. Select Cue Screen:

Allows the user to select the cue stimulus for the test. The cue is always the C5 lights and/or tone when running Simple Reaction/Movement Time experiments. Only one light may be selected as a cue although it may be paired with a tone. If the tone is used as a stimulus for the test, it may not be selected as a cue. This screen may be skipped with no selection being made if no cue is desired.

Menu Controls:

Button 1:
Button 2: Select Red Light as Cue Stimulus (RED LIGHT)
Button 3: Select Orange Light as Cue Stimulus (ORANGE LIGHT)
Button 4: Select Green Light as Cue Stimulus (GREEN LIGHT)
Button 5: Select High Tone as Cue Stimulus (HIGH TONE)
Button 6: Select Low Tone as Cue Stimulus (LOW TONE)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)

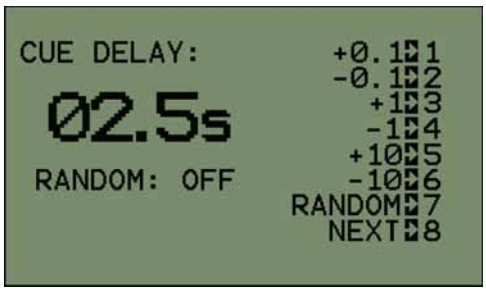
Note: Orange light is selected as an example.

7. Cue Delay Select Screen:

Allows the user to set the cue delay for the test. The resolution for the cue delay is 0.1 seconds with a maximum setting of 25.5 seconds. The random cue setting can also be enabled. The random time will fall between ½ times and 2 times the setting on the screen. The maximum and minimum limits of the random cue period are displayed at the bottom of the screen for reference.

Menu Controls:

Button 1: Increment Cue Delay by 0.1 (+0.1)
Button 2: Decrement Cue Delay by 0.1 (-0.1)
Button 3: Increment Cue Delay by 1 (+1)
Button 4: Decrement Cue Delay by 1 (-1)
Button 5: Increment Cue Delay by 10 (+10)
Button 6: Decrement Cue Delay by 10 (-10)
Button 7: Toggle Random Delay ON/OFF (RANDOM)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: 2.5 seconds is selected as an example.

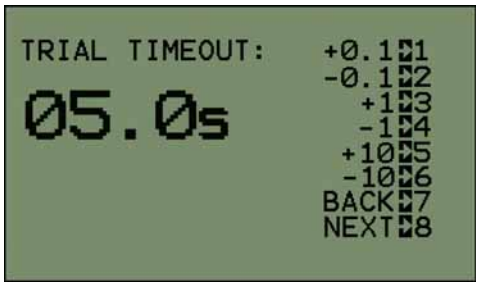
C. Simple Reaction/Movement Time: (continued)

8. Trial Timeout Selection Screen:

Allows the user to set the trial timeout time. If no response is made within the time selected, an error is indicated for the trial. The time is selectable from 0.1 to 25.5 seconds in 0.1-second increments. The timeout setting defaults to 3.0 seconds on startup.

Menu Controls:

Button 1: Increment Trial Timeout by 0.1 (+0.1)
Button 2: Decrement Trial Timeout by 0.1 (-0.1)
Button 3: Increment Trial Timeout by 1 (+1)
Button 4: Decrement Trial Timeout by 1 (-1)
Button 5: Increment Trial Timeout by 10 (+10)
Button 6: Decrement Trial Timeout by 10 (-10)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: 5.0 seconds is selected as an example.

9. Test Screen:

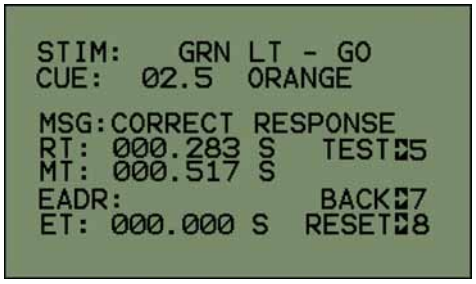
Summarizes the test as setup from the menus and displays the trial results. The first two lines of the screen indicate the stimulus and cue parameters selected for the trial. These settings will update on the onset of each trial if random parameters are being used for the trial. The stimulus line will also indicate if a "GO" or "NO GO" stimulus is being presented.

10. Trial Results:

After the test, the "RT" line will show the reaction time results of the trial in seconds and the "MT" line will show the movement time results. The "MSG" line will indicate a successful trial or an error. If an error occurs, the "MSG" line will specify the error and the "EADR" will indicate the errant key, if applicable. The "ET" line will indicate the time when the error occurred.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Run Test (TEST)
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Reset Test Screen (RESET)



Note: The results above are being used as an example.

C. Simple Reaction/Movement Time: (continued)

11. How to Start a Trial:

Trials are executed by pressing button 5 while in the Test Screen. If random parameters are used for the trial, they will update on the onset of each trial. Trial results can be reset or a trial can be interrupted by pressing the "RESET" button (8). Interrupted trials will not return any results.

Possible Response Errors:

When running Simple Reaction/Movement Time tests, four different response errors are possible:

a. Incorrect Response: Response was made when a "NO GO" stimulus was presented.

b. Timeout: No response was made when a "GO" stimulus was presented.

c. Early Response: Response was made during the cue delay.

d. Outer Rim Contact: The outer rim was contacted during the response (if enabled).

Note: Error types and locations are displayed on the Test Screen. Only errors on button C0 and C5 are recorded. All other buttons are ignored for this test type.

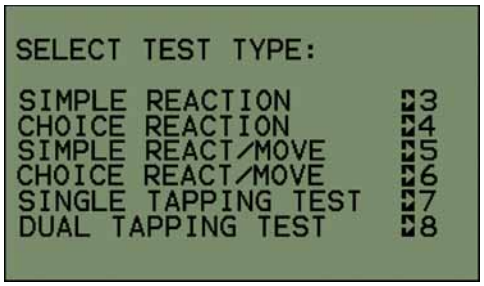
D. Choice Reaction/Movement Time:

The subject starts on single key (C0). A stimulus is presented over one of eight lights. The subject releases the C0 key and moves to the key corresponding to the light as quickly as possible.

Test Restrictions:

1. The cue stimulus is restricted to the C5 lights and tone.
2. The start key for reaction time is restricted to key C0.
3. The tone choice response is made on key C5.

1. Press button 6 from the Main Menu.

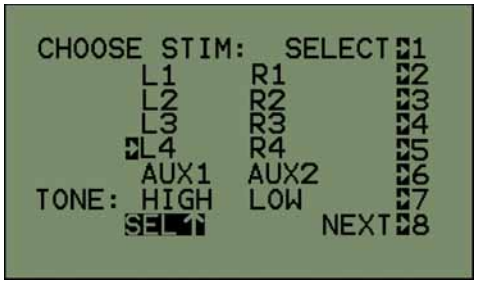


2. Stimulus Select Screen:

Allows the user to select the stimuli to be used in the test. The stimuli are referenced to the key site locations on the panel. A select cursor is shown at the bottom of the screen to indicate which column is active for selection. Tone may be used as a selection, but high and low tone cannot both be selected. The tone response will always be on key C5. Only keys that are included in the test will be monitored during a test. Keys that are not included in the test are ignored and will not indicate an error or correct response if pressed. The actual stimulus presented is chosen at random from the list of all stimuli included in the experiment.

Menu Controls:

Button 1: Toggle Between Columns for Selection (SELECT)
Button 2: Select L1 and/or R1 Site(s) as Stimulus (L1 R1)
Button 3: Select L2 and/or R2 Site(s) as Stimulus (L2 R2)
Button 4: Select L3 and/or R3 Site(s) as Stimulus (L3 R3)
Button 5: Select L4 and/or R4 Site(s) as Stimulus (L4 R4)
Button 6: Select to Use Auxiliary Keys or Lights Through the Aux 1 and/or Aux 2 Port(s) (AUX1 AUX2)
Button 7: Select High or Low Tone as Stimulus (HIGH LOW)
Button 8: Proceed to the Next Menu Screen (NEXT)



Note: L4 is selected as an example.

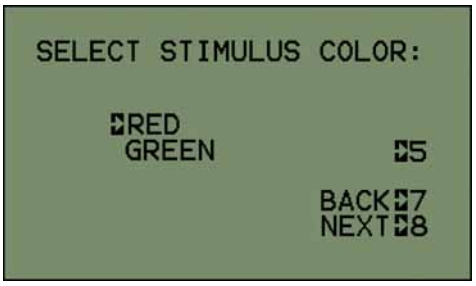
D. Choice Reaction/Movement Time: (continued)

3. Select Stimulus Color Screen:

Designates if red or green lights will be used as stimuli for the test.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Toggle Between Selecting Red or Green as Stimulus Color
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to the Next Menu Screen (NEXT)



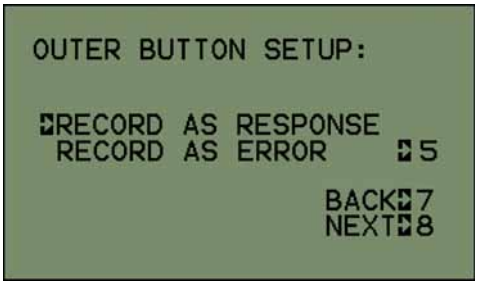
Note: Red is selected as an example.

4. Outer Button Setup Screen:

The response buttons on the Reaction Panel feature dual response zones. This allows the accuracy of the response to be monitored if required. The Outer Button Setup Screen determines if the outer rim of the response key will be recorded as a correct response or as an accuracy error.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Toggle Between Record as Response and Record as Error
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: Record as Response is selected as an example.

D. Choice Reaction/Movement Time: (continued)

5. Select Cue Screen:

Allows the user to select the cue stimulus for the test. The cue is always light C5 and/or tone when running Choice Reaction/Movement Time experiments. Only one light may be selected as a cue although it may be paired with a tone. If the tone is used as a stimulus for the test, it may not be selected as a cue. This screen may be skipped with no selection being made if no cue is desired.

Menu Controls:

Button 1:
Button 2: Select Red Light as Cue Stimulus (RED LIGHT)
Button 3: Select Orange Light as Cue Stimulus (ORANGE LIGHT)
Button 4: Select Green Light as Cue Stimulus (GREEN LIGHT)
Button 5: Select High Tone as Cue Stimulus (HIGH TONE)
Button 6: Select Low Tone as Cue Stimulus (LOW TONE)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)

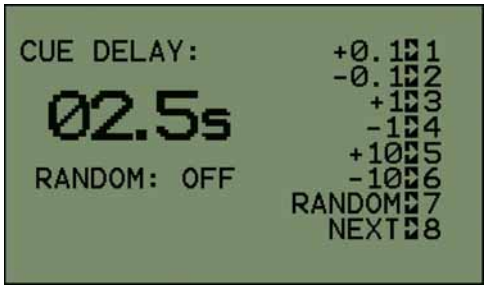
Note: Orange light is selected as an example.

6. Cue Delay Select Screen:

Allows the user to set the cue delay for the test. The resolution for the cue delay is 0.1 seconds with a maximum setting of 25.5 seconds. The random cue setting can also be enabled. The random time will fall between ½ times and 2 times the setting on the screen. The maximum and minimum limits of the random cue period are displayed at the bottom of the screen for reference.

Menu Controls:

Button 1: Increment Cue Delay by 0.1 (+0.1)
Button 2: Decrement Cue Delay by 0.1 (-0.1)
Button 3: Increment Cue Delay by 1 (+1)
Button 4: Decrement Cue Delay by 1 (-1)
Button 5: Increment Cue Delay by 10 (+10)
Button 6: Decrement Cue Delay by 10 (-10)
Button 7: Toggle Random Delay ON/OFF (RANDOM)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: 2.5 seconds is selected as an example.

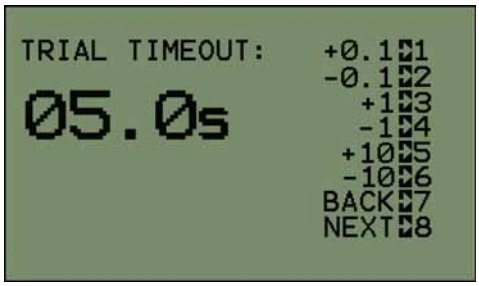
D. Choice Reaction/Movement Time: (continued)

7. Trial Timeout Selection Screen:

Allows the user to set the trial timeout time. If no response is made within the time selected, an error is indicated for the trial. The time is selectable from 0.1 to 25.5 seconds in 0.1-second increments. The timeout setting defaults to 3.0 seconds on startup.

Menu Controls:

Button 1:	Increment Trial Timeout by 0.1	(+0.1)
Button 2:	Decrement Trial Timeout by 0.1	(-0.1)
Button 3:	Increment Trial Timeout by 1	(+1)
Button 4:	Decrement Trial Timeout by 1	(-1)
Button 5:	Increment Trial Timeout by 10	(+10)
Button 6:	Decrement Trial Timeout by 10	(-10)
Button 7:	Return to Previous Menu Screen	(BACK)
Button 8:	Proceed to Next Menu Screen	(NEXT)



Note: 5.0 seconds is selected as an example.

8. Test Screen:

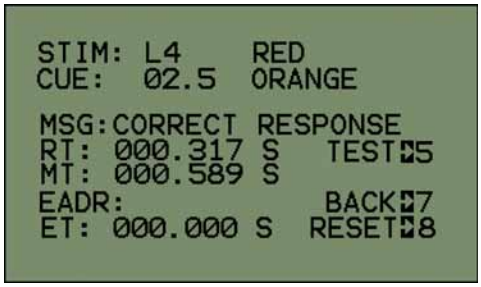
Summarizes the test as setup from the menus and displays the trial results. The first two lines of the screen indicate the stimulus and cue parameters selected for the trial. These settings will update on the onset of each trial if random parameters are being used.

9. Trial Results:

After the test, the "RT" line will show the reaction time results of the trial in seconds and the "MT" line will show the movement time results. The "MSG" line will indicate a successful trial or an error. If an error occurs, the "MSG" line will specify the error and the "EADR" will indicate the errant key, if applicable. The "ET" line will indicate the time when the error occurred. After an incorrect response, the subject can then make a correction and press the correct key. The corrected response will be shown on the "RT" line with the error information also being displayed as appropriate. The reaction time is measured from the onset of the stimulus to the lifting of the finger from the start key. Both the error time and movement time are measured from the lifting of the finger from the start key to the touching of a response key.

Menu Controls:

Button 1:		
Button 2:		
Button 3:		
Button 4:		
Button 5:	Run Test	(TEST)
Button 6:		
Button 7:	Return to Previous Menu Screen	(BACK)
Button 8:	Reset Test Screen	(RESET)



Note: The results above are being used as an example.

D. Choice Reaction/Movement Time: (continued)

10. How to Start a Trial:

Trials are executed by pressing button 5 while in the Test Screen. If random parameters are used for the test, they will update on the onset of each trial. Trial results can be reset or a trial can be interrupted by pressing the "RESET" button (8). Interrupted trials will not return any results.

***Possible Response Errors*:**

When running Choice Reaction/Movement Time tests, four different response errors are possible:

a. Incorrect Response: The wrong key was touched as a response.

b. Timeout: No response was made.

c. Early Response: Response was made during the cue delay.

d. Outer Rim Contact: The outer rim was contacted during the response (if enabled). Outer rim contact errors only appear on the correct response key. If the outer rim is contacted on an incorrect response key, the error is listed as "incorrect response" and outer rim is specified in the "EDR" line.

Note: Error types and locations are displayed on the Test Screen. Only errors on keys selected for the test are recorded. All other keys are ignored for this test type.

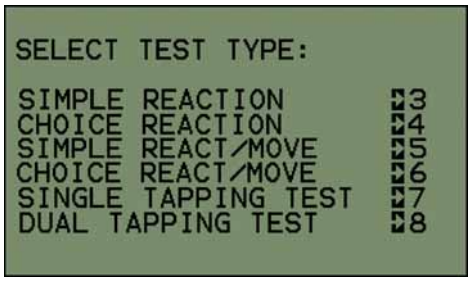
E. Single Key Tapping Test:

The subject taps a single key (C0) as quickly as possible during a timed trial period. A light turns on and off (along with optional tone) to indicate the trial time.

Test Restrictions:

1. Tap key restricted to key C0.
2. Cue restricted to C5 lights and/or tone.
3. Stimulus lights restricted to C0 lights.

1. Press button 7 from the Main Menu.



2. Tapping Button Select Screen:

Indicates that C0 will be used in the tap test. No other selections are allowed for this test.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5:
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)

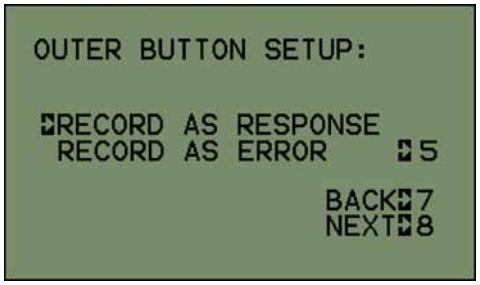
E. Single Key Tapping Test: (continued)

3. Outer Button Setup Screen:

The response keys on the Reaction Panel feature dual response zones. This allows the accuracy of the taps to be monitored if required. The Outer Button Setup Screen determines if the outer rim of the tap key will be recorded as a correct response or as an accuracy error.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Toggle Between Record as Response and Record as Error
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: Record as Response is selected as an example.

4. Light Above Buttons:

Allows the lights above the tap key to be turned on during the trial, if desired.

Menu Controls:

Button 1:
Button 2:
Button 3: Select to Keep All Lights Turned Off (OFF)
Button 4: Select Red Lights Above Buttons (RED)
Button 5: Select Green Lights Above Buttons (GREEN)
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)

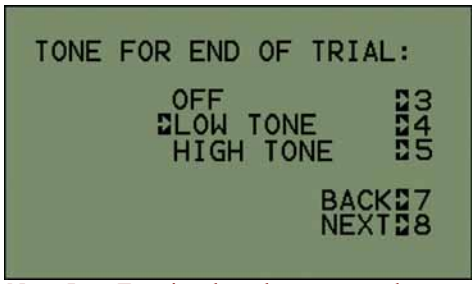
Note: Green Light is selected as an example.

5. Tone for End of Trial:

Allows the tone to be activated for the end of the trial time. This lets the subject know when the trial has ended.

Menu Controls:

Button 1:
Button 2:
Button 3: Select No Tone For End of Trial (OFF)
Button 4: Select Low Tone For End of Trial (LOW TONE)
Button 5: Select High Tone For End of Trial (HIGH TONE)
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: Low Tone is selected as an example.

E. Single Key Tapping Test: (continued)

6. Select Cue Screen:

Allows the user to select the cue stimulus for the test. The cue is always light C5 and/or tone when running Single Key Tap experiments. Only one light may selected, although it may be paired with a tone if desired. This screen may be skipped with no selection being made if no cue is desired.

Menu Controls:

Button 1:
Button 2: Select Red Light as Cue Stimulus (RED LIGHT)
Button 3: Select Orange Light as Cue Stimulus (ORANGE LIGHT)
Button 4: Select Green Light as Cue Stimulus (GREEN LIGHT)
Button 5: Select High Tone as Cue Stimulus (HIGH TONE)
Button 6: Select Low Tone as Cue Stimulus (LOW TONE)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)

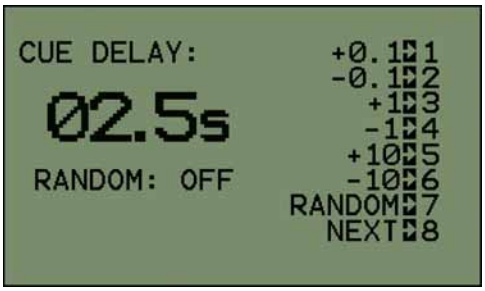
Note: Orange light is selected as an example.

7. Cue Delay Select Screen:

Allows the user to set the cue delay for the test. The resolution for the cue delay is 0.1 seconds with a maximum setting of 25.5 seconds. The random cue setting can also be enabled. The random time will fall between ½ times and 2 times the setting on the screen. The maximum and minimum limits of the random cue period are displayed at the bottom of the screen for reference.

Menu Controls:

Button 1: Increment Cue Delay by 0.1 (+0.1)
Button 2: Decrement Cue Delay by 0.1 (-0.1)
Button 3: Increment Cue Delay by 1 (+1)
Button 4: Decrement Cue Delay by 1 (-1)
Button 5: Increment Cue Delay by 10 (+10)
Button 6: Decrement Cue Delay by 10 (-10)
Button 7: Toggle Random Delay ON/OFF (RANDOM)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: 2.5 seconds is selected as an example.

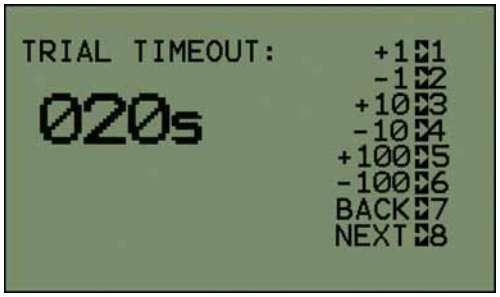
E. Single Key Tapping Test: (continued)

8. Trial Timeout Selection Screen:

Allows the user to set the length of the tapping trial. The time is selectable from 1 to 255 seconds in 1-second increments. The timeout setting defaults to 30 seconds on startup.

Menu Controls:

Button 1: Increment Trial Timeout by 1 (+1)
Button 2: Decrement Trial Timeout by 1 (-1)
Button 3: Increment Trial Timeout by 10 (+10)
Button 4: Decrement Trial Timeout by 10 (-10)
Button 5: Increment Trial Timeout by 100 (+100)
Button 6: Decrement Trial Timeout by 100 (-100)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: 20 seconds is selected as an example.

9. Test Screen:

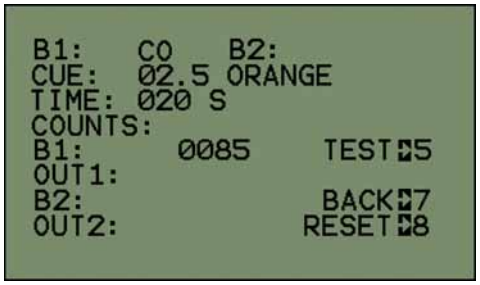
Summarizes the test as setup from the menus and displays the trial results. The first three lines of the screen indicate the times, stimulus and cue parameters selected for the trial. These settings will update on the onset of each trial if random parameters are being used.

10. Trial Results:

The total number of taps are shown in the "B1" line of the Test Screen. If the outer rim error detection is enabled, the tap amounts will be divided between the center key and the outer rim. These totals will be shown on the "B1" and "OUT1" lines. The total taps for the trial can be found by adding the two lines together.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Run Test (TEST)
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Reset Test Screen (RESET)



Note: The results above are being used as an example.

E. Single Key Tapping Test: (continued)

11. How to Start a Trial:

Trials are executed by pressing button 5 while in the Test Screen. If random parameters are used for the trial, they will update on the onset of each trial. Trial results can be reset or a trial can be interrupted by pressing the "RESET" button (8). Interrupted trials will not return any results.

Possible Response errors:

Outer Rim error: The outer rim was contacted during the trial (if enabled).

Note: Only key C0 is monitored for this test type. All other keys are ignored and key presses on them are not registered.

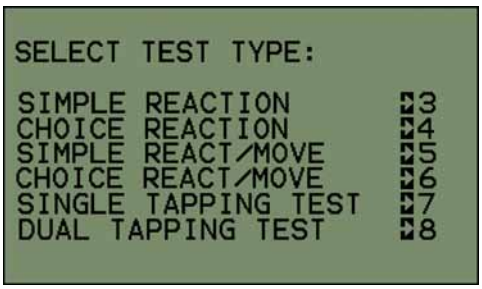
F. Dual Key Tapping Test:

The subject taps two separate keys as quickly as possible for a predetermined trial time. A light turns on and off to indicate the trial time.

Test restrictions:

1. Cue stimulus restricted to the C5 lights and/or the tone.
2. Response keys must be selected in correlative pairs. (e.g. L1/R1, L4/R4)

1. Press button 8 from the Main Menu.

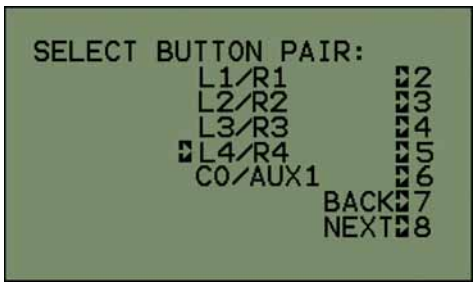


2. Tapping Button Select Screen:

Designates the key pairs to be used for the test. The keys must be selected in the pairs set in the menu. Only one pair of keys can be selected at a time. This screen will not advance until a selection has been made.

Menu Controls:

Button 1:
Button 2: Select L1 and R1 as Tapping Key Pair (L1/R1)
Button 3: Select L2 and R2 as Tapping Key Pair (L2/R2)
Button 4: Select L3 and R3 as Tapping Key Pair (L3/R3)
Button 5: Select L4 and R4 as Tapping Key Pair (L4/R4)
Button 6: Select C0 and an Auxiliary Key as Key Pair (C0/AUX1)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: L4/R4 is selected as an example.

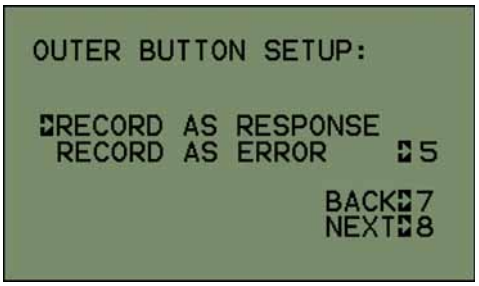
F. Dual Key Tapping Test: (continued)

3. Outer Button Setup Screen:

The response keys on the Reaction Panel feature dual response zones. This allows the accuracy of the taps to be monitored if required. The Outer Button Setup Screen determines if the outer rim of the tap keys will be recorded as a correct response or as an accuracy error.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Toggle Between Record as Response and Record as Error
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



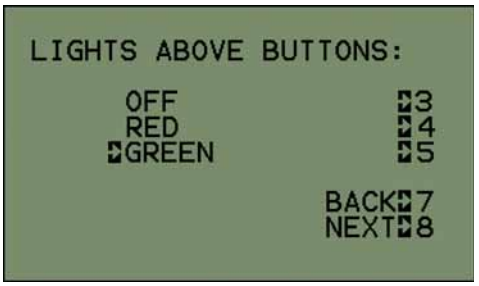
Note: Record as Response is selected as an example.

4. Light Above Buttons:

Allows the lights above the tap keys to be turned on during the trial, if desired.

Menu Controls:

Button 1:
Button 2:
Button 3: Select to Keep All Lights Turned Off (OFF)
Button 4: Select Red Lights Above Buttons (RED)
Button 5: Select Green Lights Above Buttons (GREEN)
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



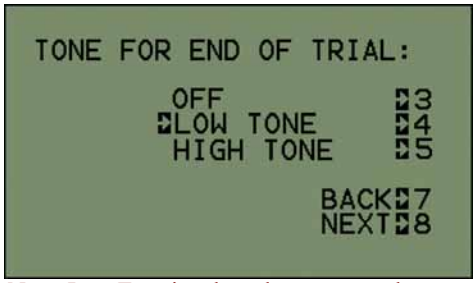
Note: Green Light is selected as an example.

5. Tone for End of Trial:

Allows the tone to be activated for the end of the trial time. This lets the subject know when the trial has ended.

Menu Controls:

Button 1:
Button 2:
Button 3: Select No Tone For End of Trial (OFF)
Button 4: Select Low Tone For End of Trial (LOW TONE)
Button 5: Select High Tone For End of Trial (HIGH TONE)
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: Low Tone is selected as an example.

F. Dual Key Tapping Test: (continued)

6. Select Cue Screen:

Allows the user to select the cue stimulus for the test. The cue is always light C5 and/or tone when running Dual Key Tap experiments. Only one light may selected, although it may be paired with a tone if desired. This screen may be skipped with no selection being made if no cue is desired.

Menu Controls:

Button 1:
Button 2: Select Red Light as Cue Stimulus (RED LIGHT)
Button 3: Select Orange Light as Cue Stimulus (ORANGE LIGHT)
Button 4: Select Green Light as Cue Stimulus (GREEN LIGHT)
Button 5: Select High Tone as Cue Stimulus (HIGH TONE)
Button 6: Select Low Tone as Cue Stimulus (LOW TONE)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)

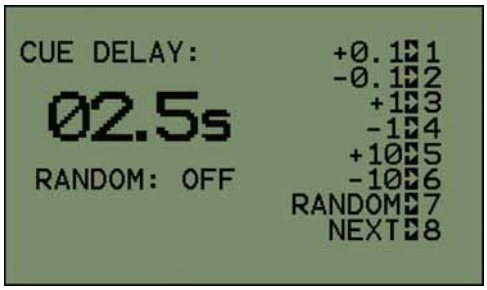
Note: Orange light is selected as an example.

7. Cue Delay Select Screen:

Allows the user to set the cue delay for the test. The resolution for the cue delay is 0.1 seconds with a maximum setting of 25.5 seconds. The random cue setting can also be enabled. The random time will fall between ½ times and 2 times the setting on the screen. The maximum and minimum limits of the random cue period are displayed at the bottom of the screen for reference.

Menu Controls:

Button 1: Increment Cue Delay by 0.1 (+0.1)
Button 2: Decrement Cue Delay by 0.1 (-0.1)
Button 3: Increment Cue Delay by 1 (+1)
Button 4: Decrement Cue Delay by 1 (-1)
Button 5: Increment Cue Delay by 10 (+10)
Button 6: Decrement Cue Delay by 10 (-10)
Button 7: Toggle Random Delay ON/OFF (RANDOM)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: 2.5 seconds is selected as an example.

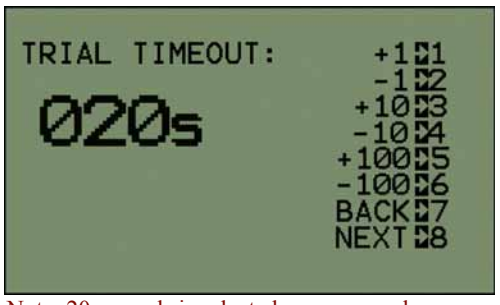
F. Dual Key Tapping Test: (continued)

8. Trial Timeout Selection Screen:

Allows the user to set the length of the tapping trial. The time is selectable from 1 to 255 seconds in 1-second increments. The timeout setting defaults to 30 seconds on startup.

Menu Controls:

Button 1: Increment Trial Timeout by 1 (+1)
Button 2: Decrement Trial Timeout by 1 (-1)
Button 3: Increment Trial Timeout by 10 (+10)
Button 4: Decrement Trial Timeout by 10 (-10)
Button 5: Increment Trial Timeout by 100 (+100)
Button 6: Decrement Trial Timeout by 100 (-100)
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Proceed to Next Menu Screen (NEXT)



Note: 20 seconds is selected as an example.

9. Test Screen:

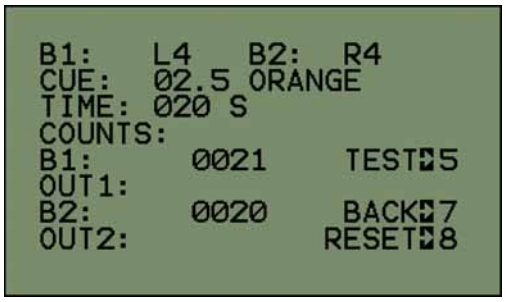
Summarizes the test as setup from the menus and displays the trial results. The first three lines of the screen indicate the times, stimulus and cue parameters selected for the trial. These settings will update on the onset of each trial if random parameters are being used.

10. Trial Results:

The total number of taps are shown in the "B1" and "B2" lines of the Test Screen. If the outer rim error detection is enabled, the tap amounts will be divided between the center key and the outer rim. These totals will be shown on the "B1", "OUT1" and "B2", "OUT2" lines. The total taps for the trial can be found by adding the four lines together.

Menu Controls:

Button 1:
Button 2:
Button 3:
Button 4:
Button 5: Run Test (TEST)
Button 6:
Button 7: Return to Previous Menu Screen (BACK)
Button 8: Reset Test Screen (RESET)



Note: The results above are used as an example.

F. Dual Key Tapping Test: (continued)

11. How to Start a Trial:

Trials are executed by pressing button 5 while in the Test Screen. If random parameters are used for the trial, they will update on the onset of each trial. Trial results can be reset or a trial can be interrupted by pressing the "RESET" button (8). Interrupted trials will not return any results.

***Possible Response errors*:**

Outer Rim error: The outer rim was contacted during the trial (if enabled).

Note: Only the selected keys are monitored for this test type. All other keys are ignored and key presses on them are not registered.

Notes:

Ordering Information:

All phone orders must be accompanied by a hard copy of your order. All must include the following information:
1) Complete billing and shipping addresses
2) Name and department of end user
3) Model number and description of desired item(s)
4) Quantity of each item desired
5) Purchase order number or method of payment
6) Telephone number

DOMESTIC TERMS

There is a $50 minimum order. Open accounts can be extended to most recognized educational institutions, hospitals and government agencies. Net amount due 30 days from the date of shipment. Enclose payment with the order; charge with VISA, MasterCard, American Express; or pay COD. We must have a hard copy of your order by mail or fax. Students, individuals and private companies may call for a credit application.

INTERNATIONAL PAYMENT INFORMATION

There is a $50 minimum order. Payment must be made in advance by: draft drawn on a major US bank; wire transfer to our account; charge with VISA, MasterCard, American Express; or confirmed irrevocable letter of credit. Proforma invoices will be provided upon request.

RETURNS

Equipment may not be returned without first receiving a Return Goods Authorization Number (RGA).

When returning equipment for service, please call Lafayette Instrument to receive a RGA number. Your RGA number will be good for 30 days. Address the shipment to: Lafayette Instrument Company, 3700 Sagamore Parkway North, Lafayette, IN 47904, U.S.A. Shipments cannot be received at the PO Box. The items should be packed well, insured for full value, and returned along with a cover letter explaining the malfunction. Please also state the name of the Lafayette Instrument representative authorizing the return. An estimate of repair will be given prior to completion ONLY if requested in your enclosed cover letter. We must have a hard copy of your purchase order by mail or fax, or repair work cannot commence.

WARRANTY

Lafayette Instrument guarantees its equipment against all defects in materials and workmanship to the ORIGINAL PURCHASER for a period of one (1) year from the date of shipment, unless otherwise stated. During this period, Lafayette Instrument will repair or replace, at its option, any equipment found to be defective in materials or workmanship. If a problem arises, please contact our office for prior authorization before returning the item. This warranty does not extend to damaged equipment resulting from alteration, misuse, negligence or abuse, normal wear or accident. In no event shall Lafayette Instrument be liable for incidental or consequential damages. There are no implied warranties or merchantability of fitness for a particular use, or of any other nature. Warranty period for repairs or used equipment purchased from Lafayette Instrument is 90 days.

DAMAGED GOODS

Damaged equipment should not be returned to Lafayette Instrument prior to thorough inspection.

When a shipment arrives damaged, note damage on delivery bill and have the driver sign it to acknowledge the damage. Contact the delivery service, and they will file an insurance claim. When damage is not detected at the time of delivery, contact the carrier and request an inspection within 10 days of the original delivery. Please call the Lafayette Instrument Customer Service Department for a return authorization for repair or replacement of the damaged merchandise.

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